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United States Patent [19]

Thurlow et al.

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[45] **Date of Patent: Jun. 29, 1999**

[54] **SYSTEM AND METHOD FOR CREATING, EDITING, AND DISTRIBUTING RULES FOR PROCESSING ELECTRONIC MESSAGES**

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[73] Assignee: **Microsoft Corporation**, Redmond, Wash.

[21] Appl. No.: **08/791,885**

[22] Filed: **Jan. 31, 1997**

[51] **Int. Cl.**^{6} **G06F 15/00**

[52] **U.S. Cl.** **345/347**; 345/326; 345/352; 706/45; 706/47; 395/200.36; 395/200.37

[58] **Field of Search** 345/226, 330, 345/331, 332, 347, 326, 340, 352; 706/45, 47; 395/200.34, 200.35, 200.36, 200.37

[56] **References Cited**

U.S. PATENT DOCUMENTS

5,283,856	2/1994	Gross et al.	706/47
5,627,764	5/1997	Schutzman et al.	395/200.37

OTHER PUBLICATIONS

Levin et al., "Intelligent Tools for Electronic Networks: A Message Assistant," *OCLC Micro*, vol. 6, No. 5, pp. 29–31 (Oct. 1990).

"Managing the mail–strom," *Infoworld*, pp. 142–143, 146–148, 150, 152, 154, 156, 158, 160, 162, 164–165 (Nov. 14, 1994).

Lai et al., "Object Lens: A 'Spreadsheet' for Cooperative Work," Paper presented at Management in the 1990's, Sloan School of Management, Massachusetts Institute of Technology, Sep., 1988.

Lotus cc:Mail Release 2 E–mail for Windows User's Guide, Chapter 9, pp. 161–180, ©1991–1993.

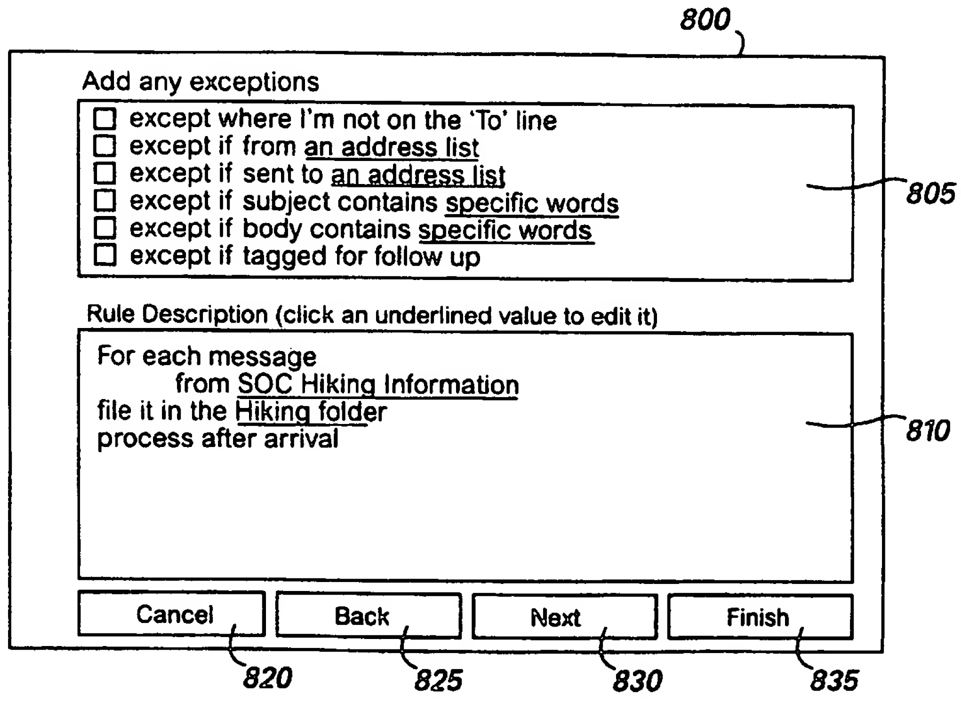
Window NT, Version 4.0, Microsoft Echange Help File, pp. 1–15, 1996.

Primary Examiner—Ba Huynh
Attorney, Agent, or Firm—Jones & Askew, LLP

[57] **ABSTRACT**

A desktop information manager includes a "Rules Wizard" for creating and editing rules for processing electronic messages. The Rules Wizard allows creation of rules in a step-by-step manner by selecting natural language phrases representing conditions, actions, and exceptions. As rule components are selected by the user, the current rule is displayed in a natural language format. Variables are displayed as hypertext links. When the user specifies the value of a variable, the specified value is threaded back into the displayed rule. Templates and a rules from context feature expedite the construction of rules. Once created rules are stored on the client computer and possibly uploaded to the server in order to ensure efficient message processing.

24 Claims, 10 Drawing Sheets



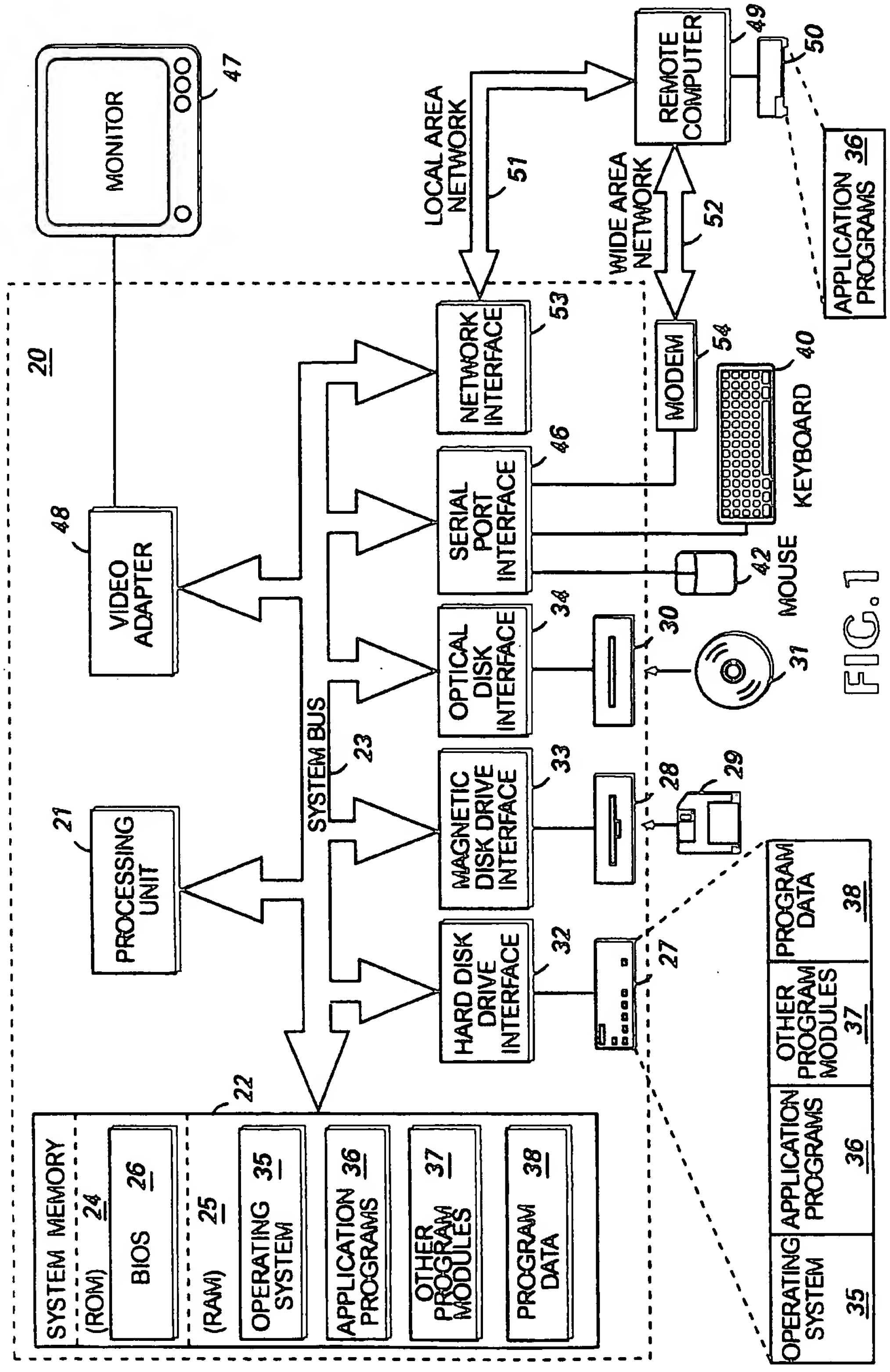
Add any exceptions

- ☐ except where I'm not on the 'To' line
- ☐ except if from an address list
- ☐ except if sent to an address list
- ☐ except if subject contains specific words
- ☐ except if body contains specific words
- ☐ except if tagged for follow up

Rule Description (click an underlined value to edit it)

For each message
from SOC Hiking Information
file it in the Hiking folder
process after arrival

05/12/2004, EAST Version: 1.4.1



20
SYSTEM MEMORY
22
(ROM) 24
BIOS 26
(RAM) 25
OPERATING SYSTEM 35
APPLICATION PROGRAMS 36
OTHER PROGRAM MODULES 37
PROGRAM DATA 38
PROCESSING UNIT
21
VIDEO ADAPTER
48
MONITOR
47
SYSTEM BUS
23
HARD DISK DRIVE INTERFACE
32
MAGNETIC DISK DRIVE INTERFACE
33
OPTICAL DISK INTERFACE
34
SERIAL PORT INTERFACE
46
NETWORK INTERFACE
53
27
28
29
30
31
MOUSE
42
KEYBOARD
40
MODEM
54
LOCAL AREA NETWORK
51
WIDE AREA NETWORK
52
REMOTE COMPUTER
49
50
APPLICATION PROGRAMS 36
OPERATING SYSTEM 35
APPLICATION PROGRAMS 36
OTHER PROGRAM MODULES 37
PROGRAM DATA 38

FIG. 1

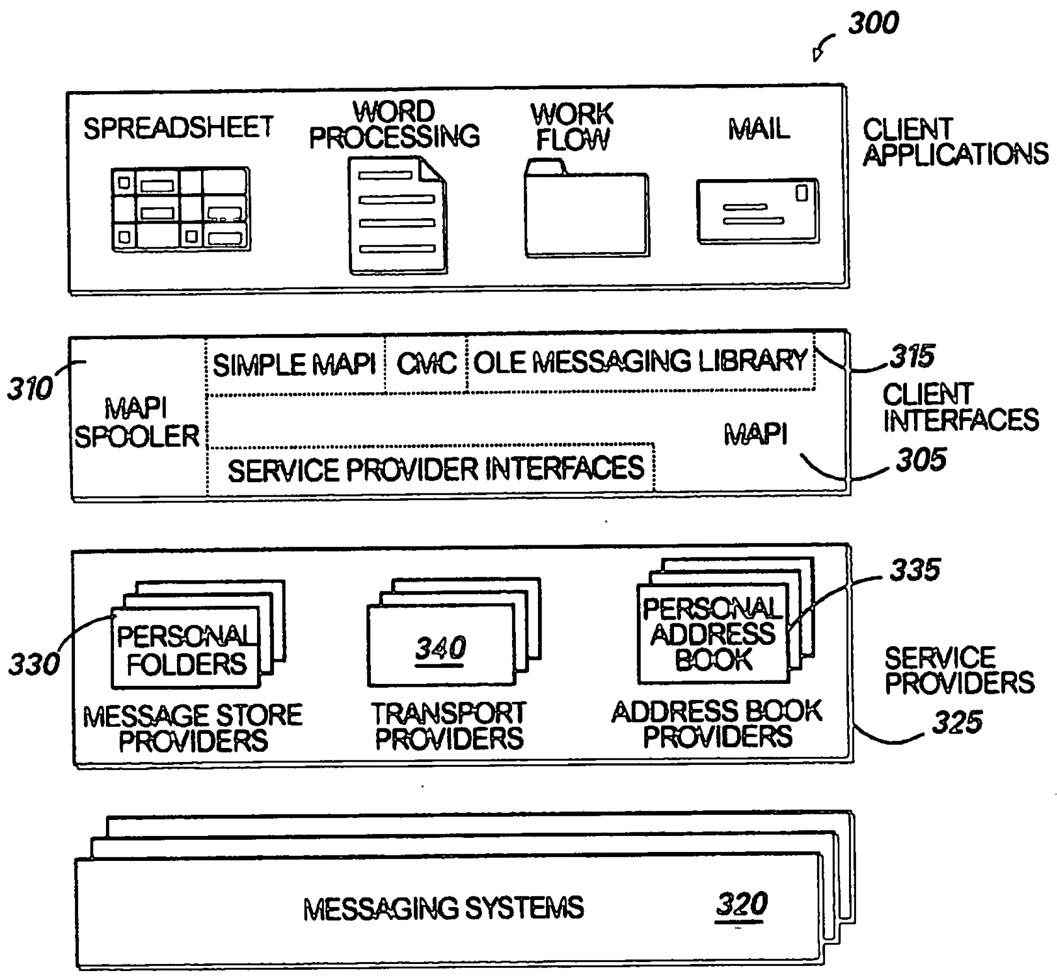

300
SPREADSHEET
WORD PROCESSING
WORK FLOW
MAIL
CLIENT APPLICATIONS
310
MAPI SPOOLER
SIMPLE MAPI
CMC
OLE MESSAGING LIBRARY
315
CLIENT INTERFACES
MAPI
305
SERVICE PROVIDER INTERFACES
330
PERSONAL FOLDERS
MESSAGE STORE PROVIDERS
340
TRANSPORT PROVIDERS
335
PERSONAL ADDRESS BOOK
ADDRESS BOOK PROVIDERS
SERVICE PROVIDERS
325
MESSAGING SYSTEMS
320

FIG.2

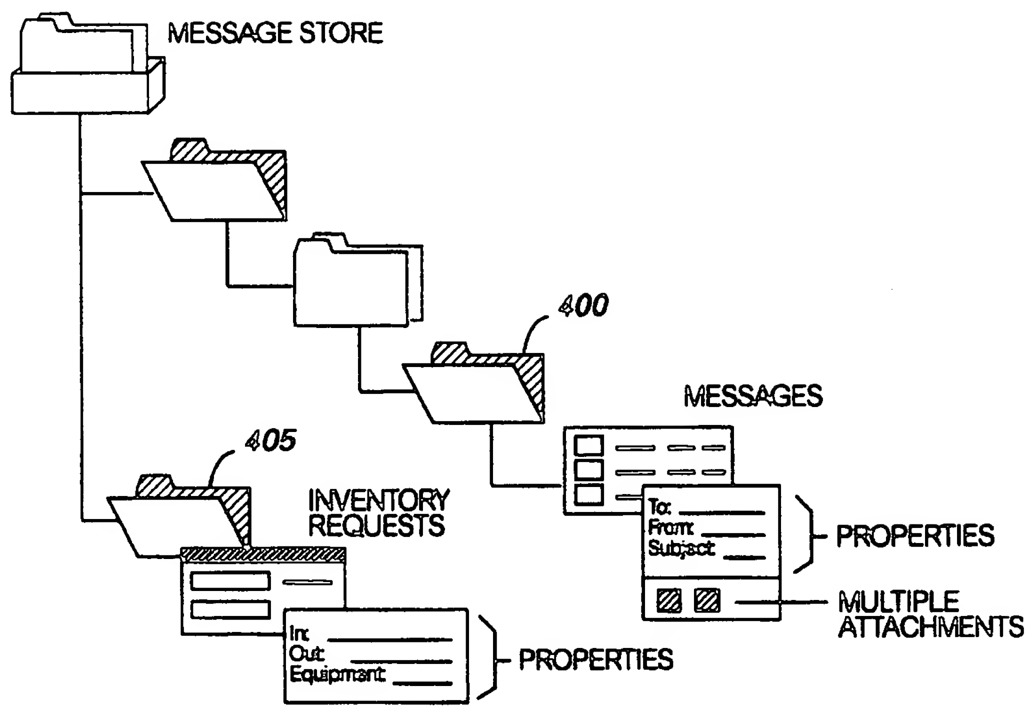

MESSAGE STORE
400
MESSAGES
405
INVENTORY REQUESTS
To:
From:
Subject:
PROPERTIES
MULTIPLE ATTACHMENTS
In:
Out:
Equipment:
PROPERTIES

FIG.3

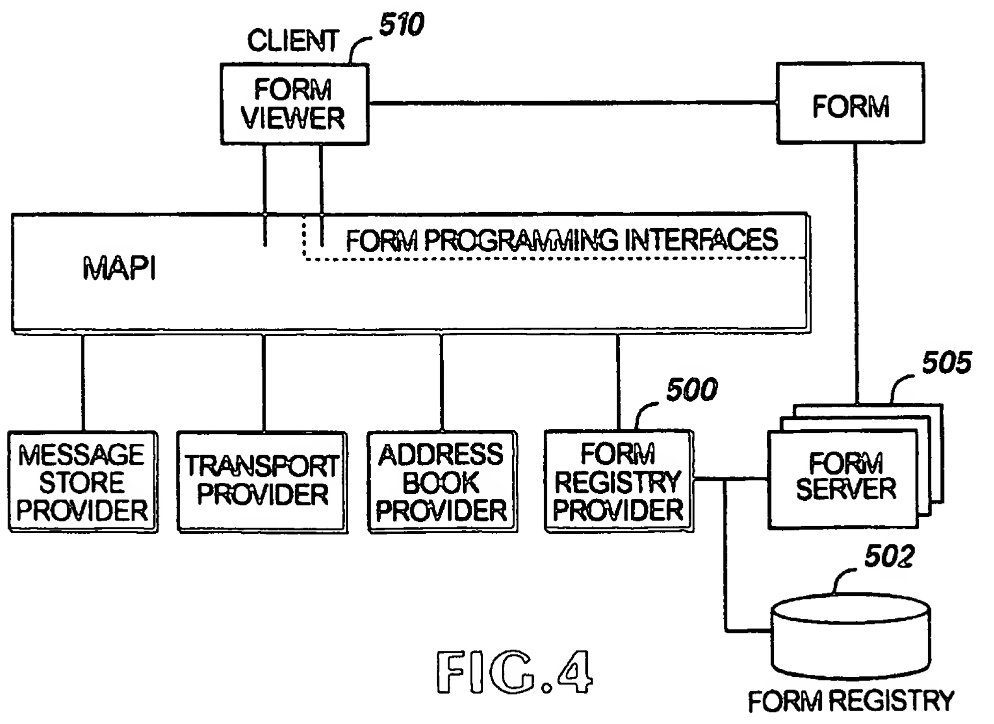

CLIENT
510
FORM VIEWER
FORM
MAPI
FORM PROGRAMMING INTERFACES
505
500
MESSAGE STORE PROVIDER
TRANSPORT PROVIDER
ADDRESS BOOK PROVIDER
FORM REGISTRY PROVIDER
FORM SERVER
502
FORM REGISTRY

FIG.4

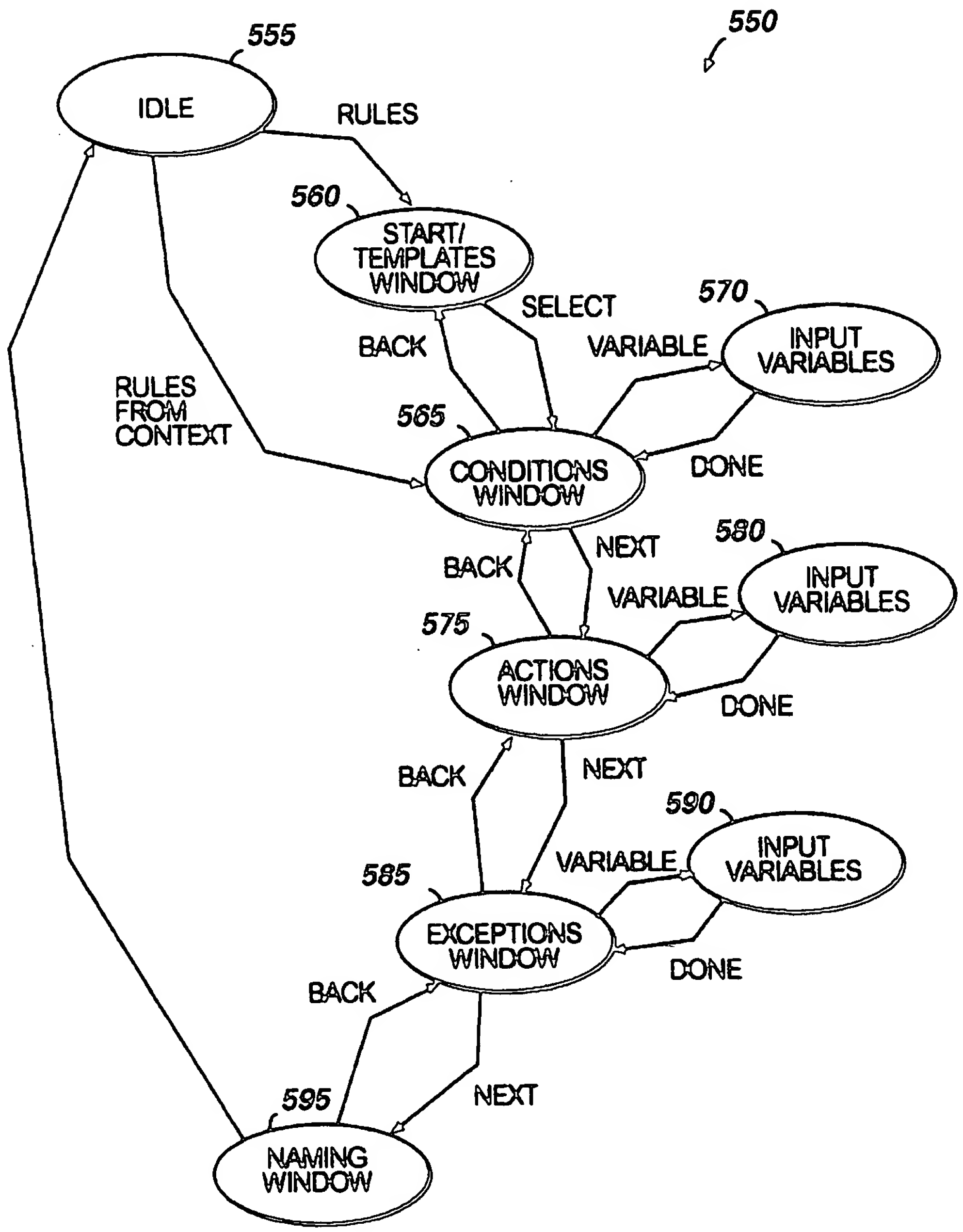
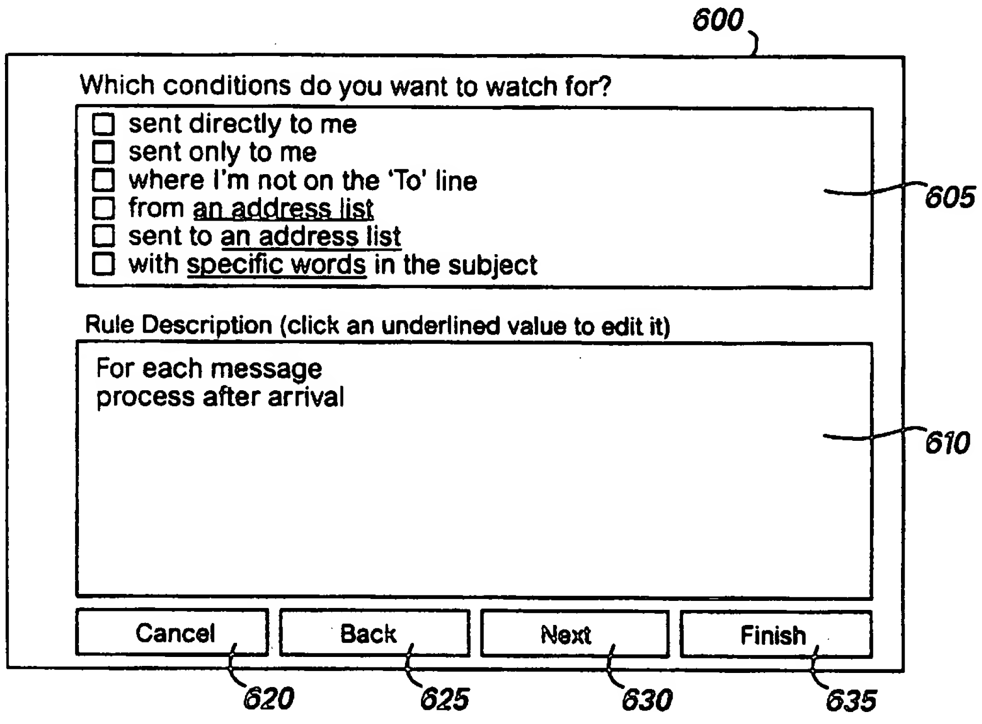

550
555
IDLE
RULES
560
START/ TEMPLATES WINDOW
SELECT
BACK
570
VARIABLE
INPUT VARIABLES
RULES FROM CONTEXT
565
CONDITIONS WINDOW
DONE
NEXT
580
BACK
VARIABLE
INPUT VARIABLES
575
ACTIONS WINDOW
DONE
BACK
NEXT
590
VARIABLE
INPUT VARIABLES
585
EXCEPTIONS WINDOW
DONE
BACK
595
NEXT
NAMING WINDOW

FIG. 5



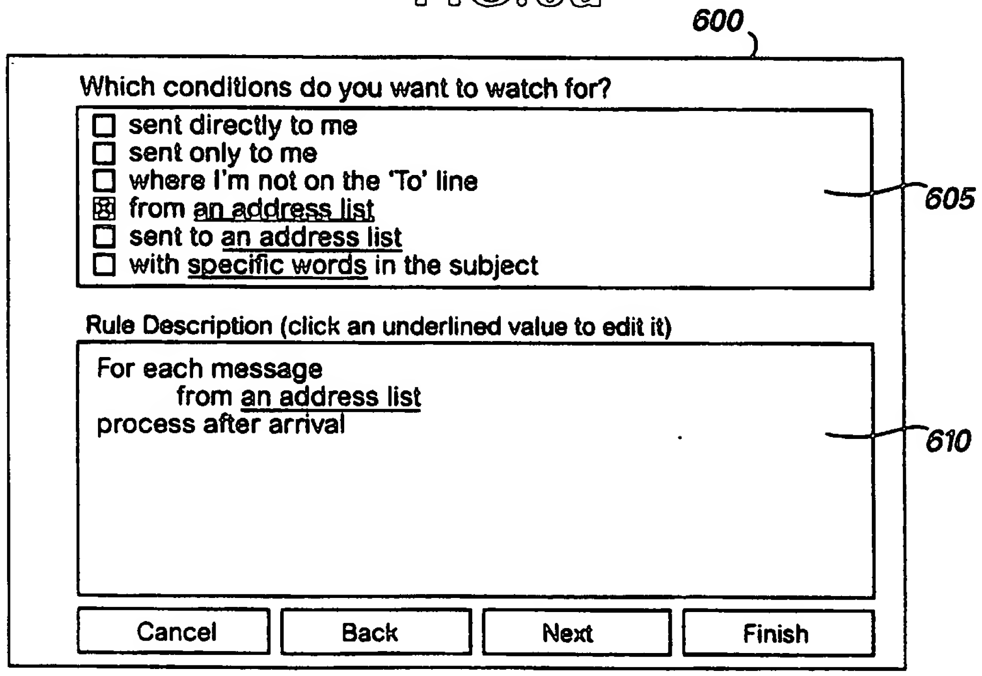
Which conditions do you want to watch for?

☐ sent directly to me
☐ sent only to me
☐ where I'm not on the 'To' line
☐ from an address list
☐ sent to an address list
☐ with specific words in the subject

Rule Description (click an underlined value to edit it)

For each message
process after arrival

FIG. 6a



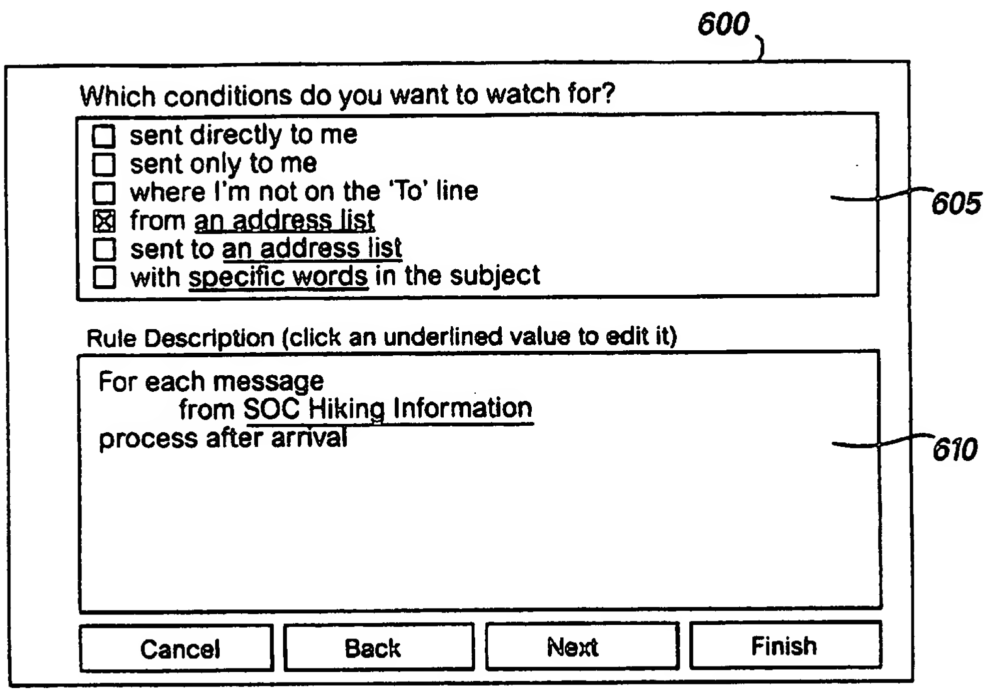
Which conditions do you want to watch for?

☐ sent directly to me
☐ sent only to me
☐ where I'm not on the 'To' line
☒ from an address list
☐ sent to an address list
☐ with specific words in the subject

Rule Description (click an underlined value to edit it)

For each message
from an address list
process after arrival

FIG. 6b



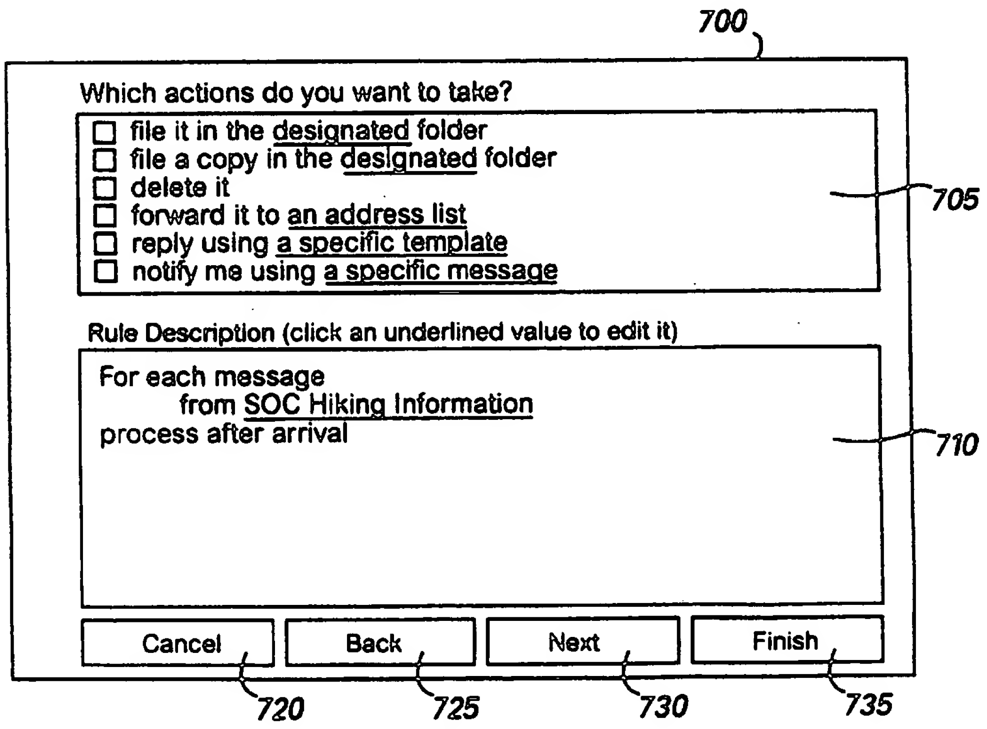
Which conditions do you want to watch for?

- ☐ sent directly to me
- ☐ sent only to me
- ☐ where I'm not on the 'To' line
- ☒ from an address list
- ☐ sent to an address list
- ☐ with specific words in the subject

Rule Description (click an underlined value to edit it)

For each message
from SOC Hiking Information
process after arrival

FIG. 6c



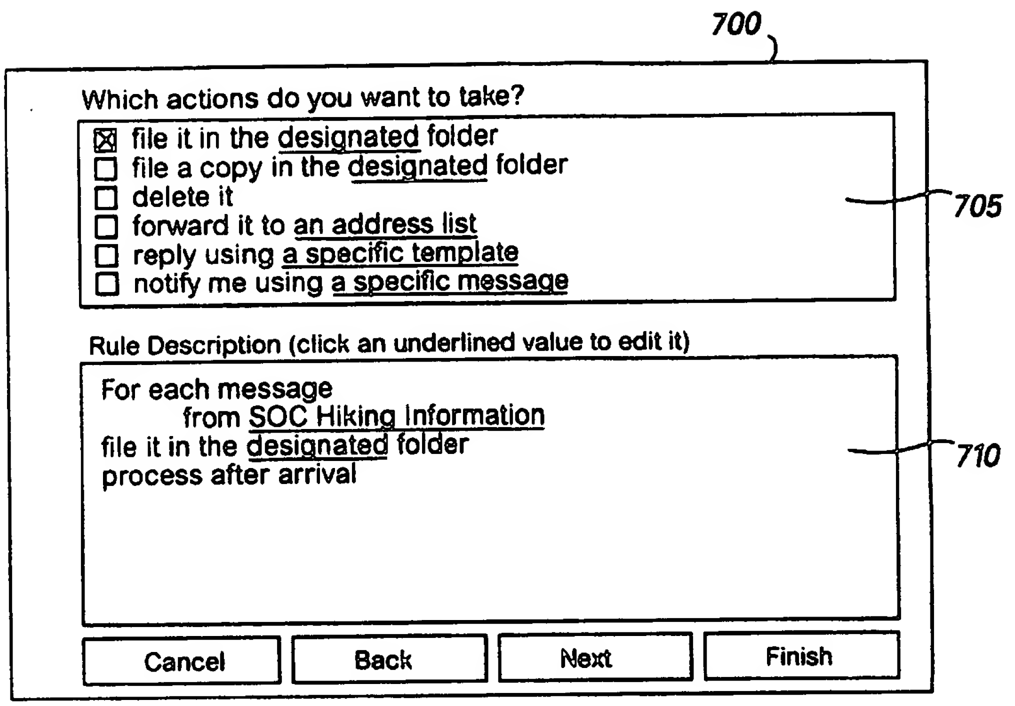
Which actions do you want to take?

- ☐ file it in the designated folder
- ☐ file a copy in the designated folder
- ☐ delete it
- ☐ forward it to an address list
- ☐ reply using a specific template
- ☐ notify me using a specific message

Rule Description (click an underlined value to edit it)

For each message
from SOC Hiking Information
process after arrival

FIG. 7a



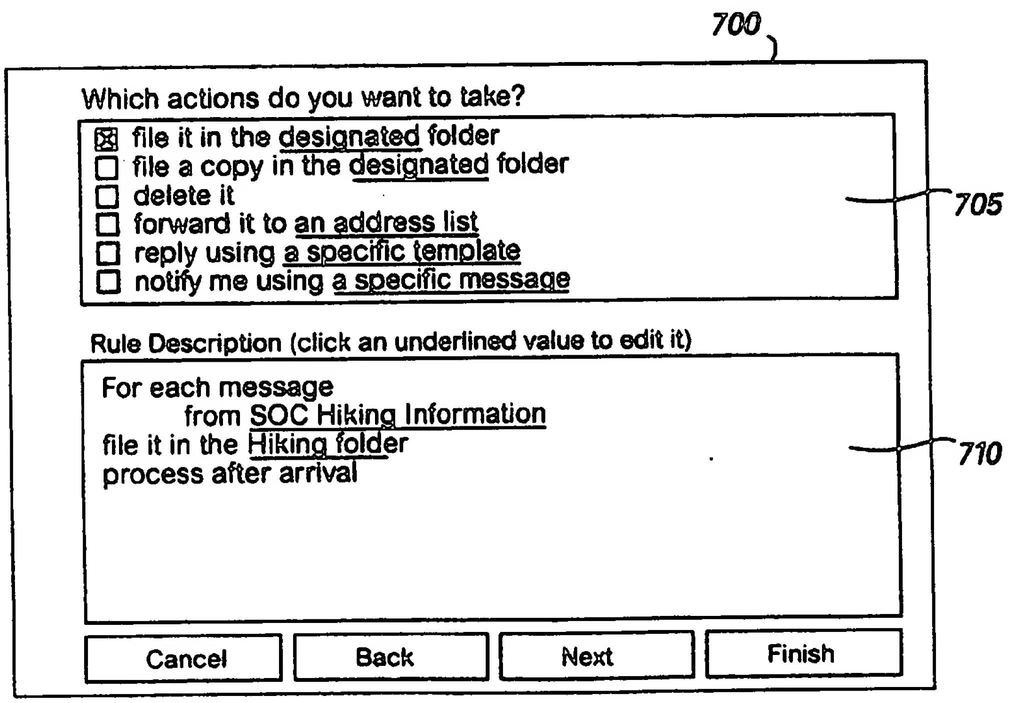
Which actions do you want to take?

- [✓] file it in the designated folder
- [ ] file a copy in the designated folder
- [ ] delete it
- [ ] forward it to an address list
- [ ] reply using a specific template
- [ ] notify me using a specific message

Rule Description (click an underlined value to edit it)

For each message
from SOC Hiking Information
file it in the designated folder
process after arrival

FIG. 7b



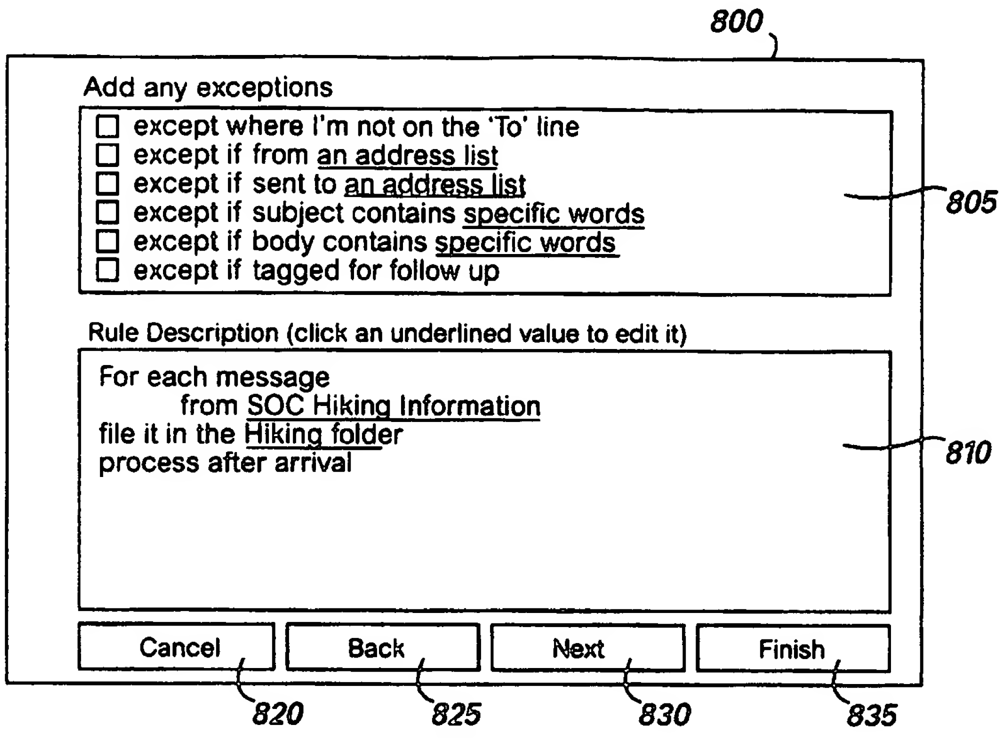
Which actions do you want to take?

- [✓] file it in the designated folder
- [ ] file a copy in the designated folder
- [ ] delete it
- [ ] forward it to an address list
- [ ] reply using a specific template
- [ ] notify me using a specific message

Rule Description (click an underlined value to edit it)

For each message
from SOC Hiking Information
file it in the Hiking folder
process after arrival

FIG. 7c



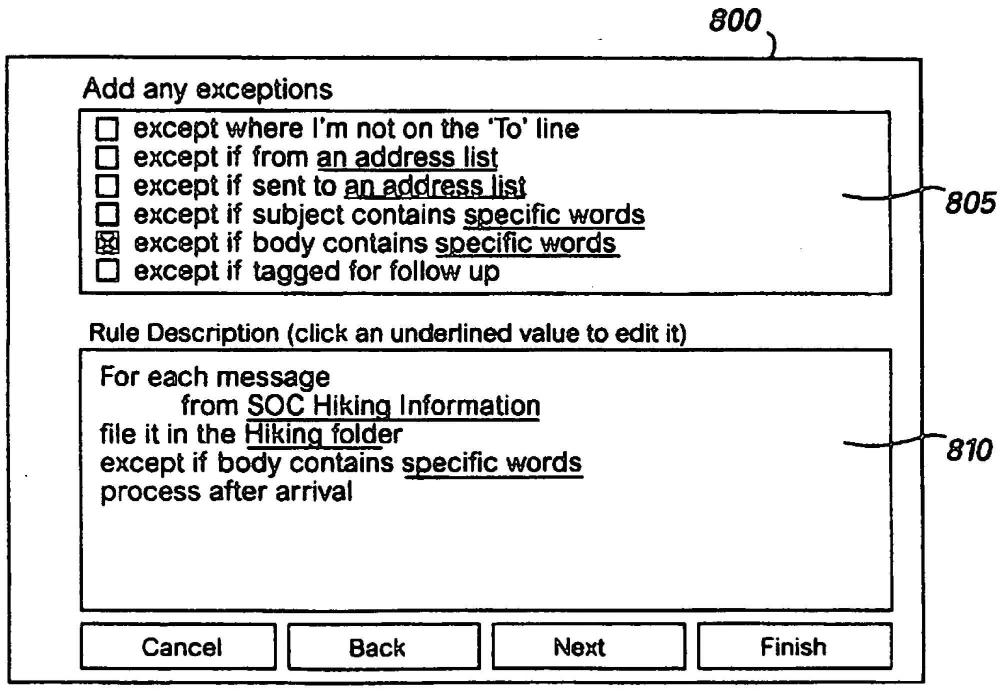
Add any exceptions

- ☐ except where I'm not on the 'To' line
- ☐ except if from an address list
- ☐ except if sent to an address list
- ☐ except if subject contains specific words
- ☐ except if body contains specific words
- ☐ except if tagged for follow up

Rule Description (click an underlined value to edit it)

For each message
from SOC Hiking Information
file it in the Hiking folder
process after arrival

FIG. 8a



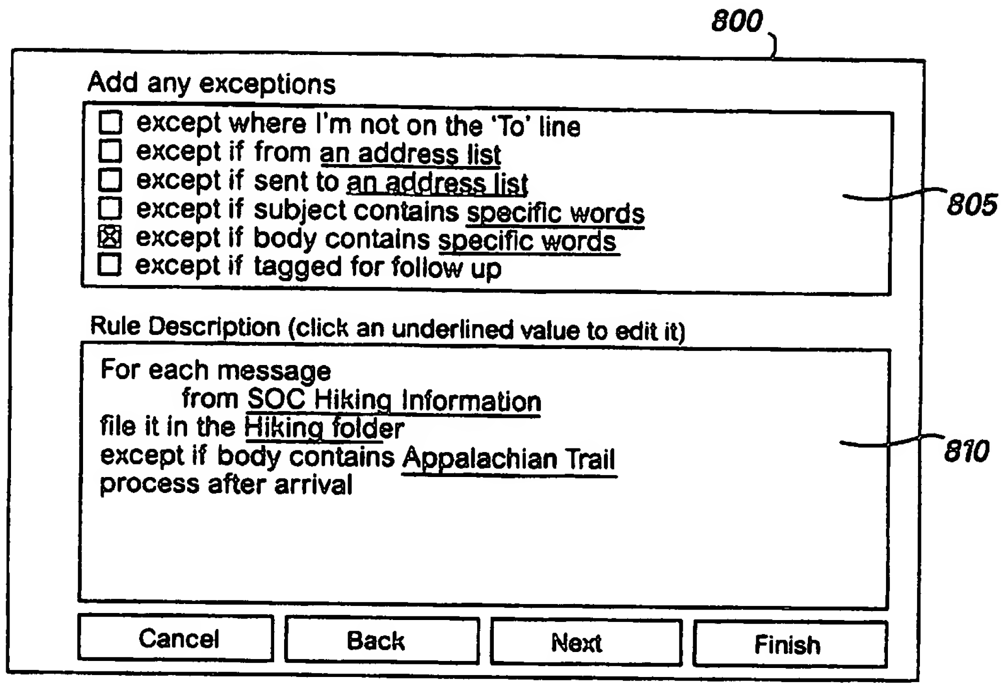
Add any exceptions

- ☐ except where I'm not on the 'To' line
- ☐ except if from an address list
- ☐ except if sent to an address list
- ☐ except if subject contains specific words
- ☒ except if body contains specific words
- ☐ except if tagged for follow up

Rule Description (click an underlined value to edit it)

For each message
from SOC Hiking Information
file it in the Hiking folder
except if body contains specific words
process after arrival

FIG. 8b



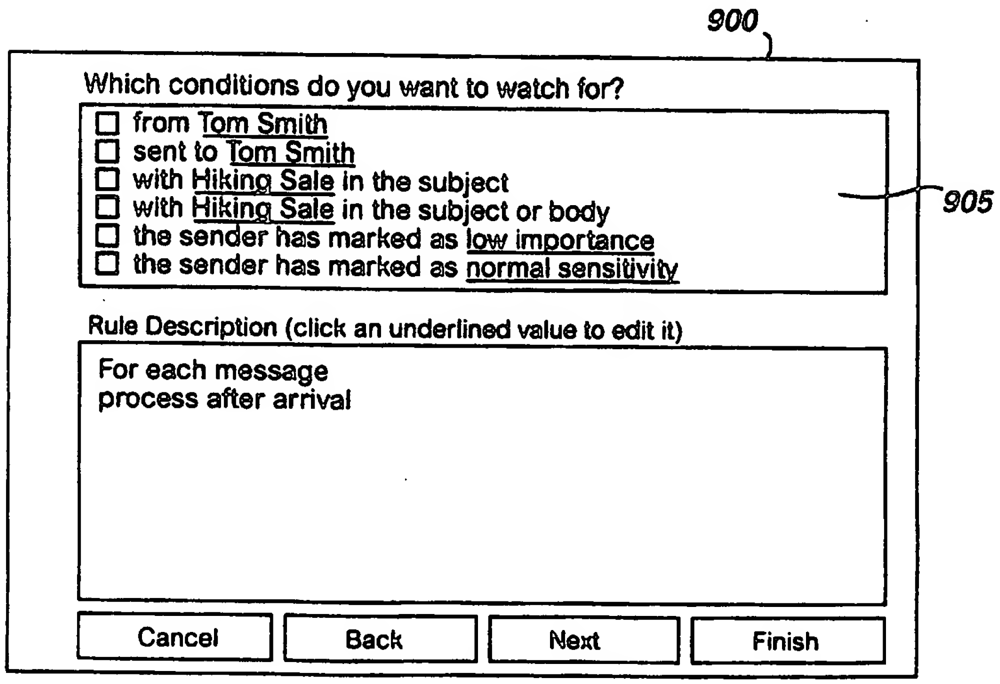
Add any exceptions

- ☐ except where I'm not on the 'To' line
- ☐ except if from an address list
- ☐ except if sent to an address list
- ☐ except if subject contains specific words
- ☒ except if body contains specific words
- ☐ except if tagged for follow up

Rule Description (click an underlined value to edit it)

For each message
from SOC Hiking Information
file it in the Hiking folder
except if body contains Appalachian Trail
process after arrival

FIG. 8c



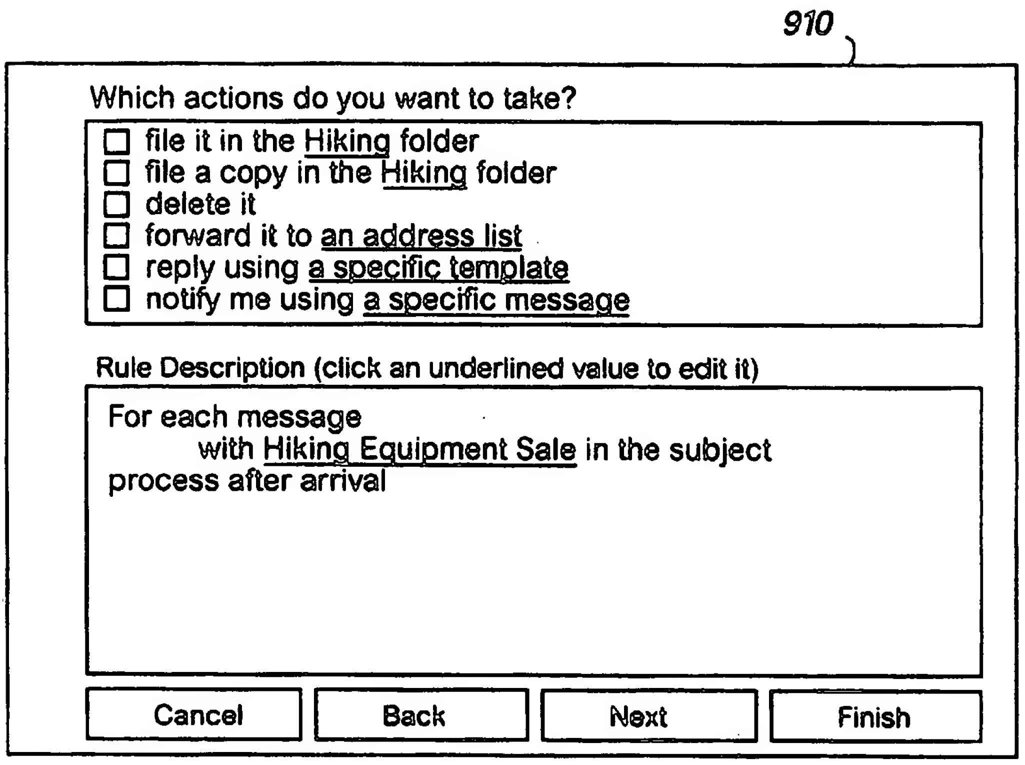
Which conditions do you want to watch for?

- ☐ from Tom Smith
- ☐ sent to Tom Smith
- ☐ with Hiking Sale in the subject
- ☐ with Hiking Sale in the subject or body
- ☐ the sender has marked as low importance
- ☐ the sender has marked as normal sensitivity

Rule Description (click an underlined value to edit it)

For each message
process after arrival

FIG. 9a



Which actions do you want to take?

- ☐ file it in the Hiking folder
- ☐ file a copy in the Hiking folder
- ☐ delete it
- ☐ forward it to an address list
- ☐ reply using a specific template
- ☐ notify me using a specific message

Rule Description (click an underlined value to edit it)

For each message
with Hiking Equipment Sale in the subject
process after arrival

FIG. 9b

SYSTEM AND METHOD FOR CREATING, EDITING, AND DISTRIBUTING RULES FOR PROCESSING ELECTRONIC MESSAGES

TECHNICAL FIELD

The present invention relates to a system and method for organizing electronic messages, and more particularly relates to an improved system and method for creating, editing, and distributing rules for automatically processing electronic messages.

BACKGROUND OF THE INVENTION

Electronic mail (e-mail) and other types of electronic messages are becoming extremely popular. Business users increasingly rely on electronic messages to share ideas, transmit documents, schedule meetings, and perform a multitude of other everyday tasks.

These tasks may be accomplished by a variety of software programs. For example, e-mail programs facilitate the transmission of messages between users. Messaging-enabled scheduling programs allow users to request and schedule meetings and appointments via electronic messages. Computer programs known as desktop information managers attempt to coordinate the growing stream of electronic communications by incorporating e-mail, a calendar, task management, contact management, notes, and journal features into a single application program.

The increased reliance on electronic messaging has resulted in a great increase in the number of electronic messages a user sends and receives daily. Users who send and receive a large number of e-mail messages would like an effective way to process their e-mail without spending a lot of time sorting through their inbox, deleting, filing, forwarding, and responding to their messages.

In general, this type of processing may be performed by rules or commands that automatically execute specific tasks when user-provided criteria are met. For example, a user may want to file all e-mail from a certain user or regarding a certain subject in a specific folder. In the prior art, this type of function was provided by a programming-type scripting language that was used to specify events and to designate actions for events that meet those conditions. Because it relies on a cryptic, programming-type language, this approach is not very user-friendly.

A more recent prior art approach allows users to build rules by choosing predefined conditions and actions, which are presented via a simple graphical user interface. Although this approach employs a graphical user interface, it does not provide the user with a step-by-step guide through the rules creation process. In this approach, only the most common rules are exposed to the user, and there is very little customization allowed.

Therefore, there is a need in the art for an improved method for creating and editing rules for processing electronic messages. This method should provide an improved user interface for creating and editing rules for handling electronic messages. In addition to an improved user interface, the system should allow rules to be applied at the desktop or at the server or at both, in order to process electronic messages in the most efficient manner.

SUMMARY OF THE INVENTION

The present invention satisfies the above-described needs by providing an improved system and method for creating and editing rules for processing electronic messages. The

present invention provides a user interface that guides the user through the process of creating or editing a rule. At each step, the available rules components are displayed as natural language (e.g., English) phrases. As components are selected, the resulting rule is composed and displayed in a natural language format. Variables are displayed in highlighted text. When the user defines a variable, the user-specified definition is displayed in the context of the message. Templates and the ability to create rules based on existing messages further simplify the process of creating rules.

In one aspect, the present invention provides a method for constructing a rule for processing electronic messages. The method includes displaying the current state of the rule in a natural language format. Conditions are displayed and, in response to an input signal indicating the selection of a condition, the selected condition is added to the displayed current state of the rule. Actions are also displayed. In response to an input signal indicating the selection of an action, the selected action is added to the displayed current state of the rule. The rule is then stored for subsequent processing of electronic messages.

More particularly described, the displayed rule includes variables that are displayed as highlighted text in the context of the natural language format. Upon receipt of an input signal indicating the selection of the highlighted text, a dialog is displayed in order to allow the selection of a definition for the variable. Upon receipt of an input signal indicating the selection of the definition for the variable, the rule is displayed with the definition in the place of the original variable.

In another aspect, the present invention provides a method for constructing a rule for processing electronic messages. The method includes displaying a list of rule templates and receiving an input signal indicating the selection of one of the rule templates. A condition and action associated with the selected template are then displayed. The current state of the rule is displayed in a natural language format. The rule is then stored for subsequent processing of electronic messages.

In yet another aspect, the present invention provides a method for distributing electronic message processing rules between a client computer and a server computer. The method includes displaying the current state of the rule in a natural language format. Conditions are displayed and, in response to the selection of one of the conditions, the selected condition is added to the displayed current state of the rule. Actions are also displayed. An input selecting one of the actions is received and the selected action is added to the displayed current state of the rule. The method includes determining whether the rule may be run on a server. If so, the rule is uploaded to the server.

The various aspects of the present invention may be more clearly understood and appreciated from a review of the following detailed description of the disclosed embodiments and by reference to the appended drawings and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of a personal computer that provides the operating environment for an embodiment of the present invention.

FIG. 2 is a diagram illustrating the modular architecture defined by the Messaging Application Programming Interface (MAPI).

FIG. 3 is a diagram illustrating the hierarchical arrangement of a MAPI message store.

FIG. 4 is a diagram illustrating the MAPI form architecture.

FIG. 5 is a state diagram illustrating a method for creating and editing rules for processing electronic messages.

FIG. 6, consisting of FIGS. 6*a*, 6*b*, and 6*c*, illustrates the information displayed in a conditions window.

FIG. 7, consisting of FIGS. 7*a*, 7*b*, and 7*c*, illustrates the information displayed in an actions window.

FIG. 8, consisting of FIGS. 8*a*, 8*b*, and 8*c*, illustrates the information displayed in an exceptions window.

FIG. 9, consisting of FIGS. 9*a* and 9*b*, illustrates information displayed when the "rules from context" options is selected.

DETAILED DESCRIPTION

The present invention is directed toward a method and system for creating and editing rules for processing electronic messages. In one embodiment, the invention is incorporated into a desktop information manager application program entitled "OUTLOOK 97," which is published by Microsoft Corporation of Redmond, Washington. Briefly described, the "OUTLOOK 97" program allows users to manage their own calendar, messages, tasks, notes, and contacts and to share this information with others. The present invention allows users to easily create and edit rules that automatically process these electronic messages.

Referring now to the drawings, in which like numerals represent like elements throughout the several figures, aspects of the present invention and an exemplary operating environment will be described.

EXEMPLARY OPERATING ENVIRONMENT

FIGS. 1–4 illustrate various aspects of the preferred computing environment in which the present invention is designed to operate. Those skilled in the art will immediately appreciate that FIGS. 1–4 and the associated discussion are intended to provide a brief, general description of the preferred computer hardware and program modules, and that additional information is readily available in the appropriate programming manuals, user's guides, and similar publications.

THE COMPUTER HARDWARE

FIG. 1 and the following discussion are intended to provide a brief, general description of a suitable computing environment in which the invention may be implemented. While the invention will be described in the general context of an application program that runs on an operating system in conjunction with a personal computer, those skilled in the art will recognize that the invention also may be implemented in combination with other program modules. Generally, program modules include routines, programs, components, data structures, etc. that perform particular tasks or implement particular abstract data types. Moreover, those skilled in the art will appreciate that the invention may be practiced with other computer system configurations, including hand-held devices, multiprocessor systems, microprocessor-based or programmable consumer electronics, minicomputers, mainframe computers, and the like. The invention may also be practiced in distributed computing environments where tasks are performed by remote processing devices that are linked through a communications network. In a distributed computing environment, program modules may be located in both local and remote memory storage devices.

With reference to FIG. 1, an exemplary system for implementing the invention includes a conventional personal computer **20**, including a processing unit **21**, a system memory **22**, and a system bus **23** that couples the system memory to the processing unit **21**. The system memory **22** includes read only memory (ROM) **24** and random access memory (RAM) **25**. A basic input/output system **26** (BIOS), containing the basic routines that help to transfer information between elements within the personal computer **20**, such as during start-up, is stored in ROM **24**. The personal computer **20** further includes a hard disk drive **27**, a magnetic disk drive **28**, e.g., to read from or write to a removable disk **29**, and an optical disk drive **30**, e.g., for reading a CD-ROM disk **31** or to read from or write to other optical media. The hard disk drive **27**, magnetic disk drive **28**, and optical disk drive **30** are connected to the system bus **23** by a hard disk drive interface **32**, a magnetic disk drive interface **33**, and an optical drive interface **34**, respectively. The drives and their associated computer-readable media provide nonvolatile storage for the personal computer **20**. Although the description of computer-readable media above refers to a hard disk, a removable magnetic disk and a CD-ROM disk, it should be appreciated by those skilled in the art that other types of media which are readable by a computer, such as magnetic cassettes, flash memory cards, digital video disks, Bernoulli cartridges, and the like, may also be used in the exemplary operating environment.

A number of program modules may be stored in the drives and RAM **25**, including an operating system **35**, one or more application programs **36**, other program modules **37**, and program data **38**. A user may enter commands and information into the personal computer **20** through a keyboard **40** and pointing device, such as a mouse **42**. Other input devices (not shown) may include a microphone, joystick, game pad, satellite dish, scanner, or the like. These and other input devices are often connected to the processing unit **21** through a serial port interface **46** that is coupled to the system bus, but may be connected by other interfaces, such as a game port or a universal serial bus (USB). A monitor **47** or other type of display device is also connected to the system bus **23** via an interface, such as a video adapter **48**. In addition to the monitor, personal computers typically include other peripheral output devices (not shown), such as speakers or printers.

The personal computer **20** may operate in a networked environment using logical connections to one or more remote computers, such as a remote computer **49**. The remote computer **49** may be a server, a router, a peer device or other common network node, and typically includes many or all of the elements described relative to the personal computer **20**, although only a memory storage device **50** has been illustrated in FIG. 1. The logical connections depicted in FIG. 1 include a local area network (LAN) **51** and a wide area network (WAN) **52**. Such networking environments are commonplace in offices, enterprise-wide computer networks, intranets and the Internet.

When used in a LAN networking environment, the personal computer **20** is connected to the LAN **51** through a network interface **53**. When used in a WAN networking environment, the personal computer **20** typically includes a modem **54** or other means for establishing communications over the WAN **52**, such as the Internet. The modem **54**, which may be internal or external, is connected to the system bus **23** via the serial port interface **46**. In a networked environment, program modules depicted relative to the personal computer **20**, or portions thereof, may be stored in the remote memory storage device. It will be appreciated that the network connections shown are exemplary and other means of establishing a communications link between the computers may be used.

THE MAPI MESSAGING ARCHITECTURE

The operating system 35 provides the basic interface between the computer's resources, the user, and the application programs 36. As discussed earlier, an embodiment of the present invention is incorporated in the "OUTLOOK 97" application program, which is designed to operate with Microsoft Corporation's "WINDOWS 95" or "WINDOWS NT" operating systems. The operating system 35 provides a variety of functions or services that allow an application program 36 to easily deal with various types of input/output (I/O) by issuing relatively simple function calls. Generally described, an application program 36 communicates with the operating system 35 by calling predefined functions provided by the operating system 35. The operating system 35 responds by providing the requested information in a message or by executing the requested task.

In the context of the present invention, the primary interaction between the application program and the operating system involves messaging related tasks. The preferred operating system incorporates the Messaging Application Programming Interface (MAPI). The MAPI architecture is designed to make it easy for programmers to write messaging-enabled applications that are independent of the underlying messaging system. MAPI provides high-level functions that can be used to implement sophisticated messaging features with a relatively small amount of code. The code deals with functions for sending, receiving, and addressing electronic messages. The underlying messaging system is completely transparent. MAPI also provides other message-related functionality, such as access to address books.

FIG. 2 illustrates the modular architecture defined by MAPI. The client applications 300 are application programs that take advantage of the MAPI subsystem 305. Client applications 300 implement messaging tasks as either their primary or secondary focus. Messaging-based client applications, such as applications that send and receive electronic mail, implement messaging tasks as their primary focus. For non-messaging client applications, which are referred to as being "messaging-enabled" or "messaging-aware," it is a secondary feature.

The MAPI subsystem is made up of the MAPI spooler 310, a common user interface (not shown), and the programming interfaces 315. The MAPI spooler is a separate interface that is responsible for sending electronic messages to and receiving electronic messages from a messaging system. The common user interface is a set of dialog boxes that gives client applications a consistent look and users a consistent way to perform tasks.

The programming interfaces 315 are used by the MAPI subsystem 305, by client applications 300, and by service provider writers. The main programming interface is an object-based interface known as the MAPI programming interface, which is based on the OLE Component Object Model. Client applications may also utilize any of three other interfaces, including simple MAPI, Common Messaging Calls (CMC) and the OLE Messaging Library, which are primarily for messaging-enabled and messaging-aware client applications.

The MAPI spooler 310 is a separate process within the MAPI subsystem 305 and is responsible for sending electronic messages to and receiving electronic messages from

a messaging system 320. The spooler runs as a background process and also performs several functions related to electronic message distribution. These include informing a client application when a new message has been delivered, invoking message preprocessing and post processing, generating reports that indicate that message delivery has occurred, and maintaining status on processed recipients.

The MAPI service providers 325 are located between MAPI subsystem 305 and the messaging systems 320. Service providers are drivers that connect MAPI client applications 300 to an underlying messaging system 320. Most messaging systems include three types of service providers: message store providers 330, address book or directory providers 335, and message transport providers 340. The service providers work with MAPI to create and send electronic messages in the following way. Electronic messages are created using a form that is appropriate for the specific type, or class, of message. The completed electronic message is addressed to one or more recipients. When the client sends the message, the message store provider 330 checks that each recipient has a unique and valid address and that the message has all of the information necessary for transmission. If there is a question about a recipient, such as can occur when there are multiple recipients with the same name, an address book provider resolves the ambiguity. The electronic message in then placed in the outbound queue.

Address book providers 335 handle access to directory information. Depending on the type of recipient and the address book provider, there is a wide range of information that can be made available. For example, all address book providers 335 store a recipient's name, address, and address type and organize the data using one or more containers. MAPI integrates all the information supplied by the installed address book providers into a single address book, thereby presenting a unified view to the client application. The users of client applications can view the contents of address book containers and in some cases modify it. MAPI's Personal Address Book is an example of a modifiable address book container that allows new entries to be added and exiting entries to be modified or deleted.

Message store providers 330 handle the storage and retrieval of electronic messages and other information for the users of a client application. As illustrated in FIG. 3, the message information is organized using a hierarchical system known as a message store, which is implemented in multiple levels, with containers called folders holding electronic messages of different types. There is no limit to the number of levels in a message store, and folders can contain many sub-folders.

Electronic messages are units of data that are transferred from one user or application to another user or application. Every message contains some text and envelope information, which is used for transmission. Some electronic messages include one or more attachments, or additional data related to and transported with a message. The attachments and additional data may be in the form of a file, another message, or an OLE object.

Transport providers 340 handle message transmission and reception. They control the interaction between the MAPI spooler 310 and the underlying messaging system 320. They also implement security if necessary and take care of any pre-processing and post-processing tasks that are required. Client applications 300 communicate with the transport providers 340 through a message store provider 330. When an incoming message is detected, the transport provider informs the MAPI spooler and the message is delivered to the appropriate message store. To handle outgoing messages, the message store moves the message to the outbound queue, informs the MAPI spooler, and the spooler transfers it to the appropriate transport providers.

The operation of these MAPI components is illustrated by describing the flow of an electronic message through these components. The user of a client application **300** sends an electronic message to one or more recipients. A message store provider **330** initiates the sending process and formats the message with additional information needed for transmission. The MAPI spooler **310** receives the electronic message, performs any required preprocessing, and delivers it to the appropriate transport provider **340**. The transport provider **340** gives the message to its messaging system **320**, which sends it to the intended recipient(s). When an electronic message is received, the transport provider **340** receives a message from its messaging system **320** and notifies the MAPI spooler **310**. The spooler **310** performs any necessary post processing and informs the message store provider **330** that a new message has arrived. The notification causes the client application **300** to refresh its message display, which enables the user to read the new message.

Client application users can access a summary view of the messages contained within each folder or view them individually with a form. Whether the client displays a standard form supplied by MAPI or a custom form supplied by a form developer depends on the type, or class, of the message. In FIG. **3**, the first folder **400** contains note messages and uses the MAPI standard note form. The second folder **405** contains inventory request messages and uses a custom inventory form. The information on both forms represents the properties, or attributes, of the message. Messages are the units of data transferred from one user to another. Every message contains some text, which is formatted simply or more intricately depending on the form that is used, and envelope information that is used for transmission.

A MAPI property is an attribute of a MAPI object, and describes something about the object, such as the subject line of a message of the address type of a distribution list. Every MAPI property has a value, a type, and an identifier. The value is the descriptive data, such as the text in a message body. The type describes the kind of data, such as a string, numeric, or Boolean. The identifier is the number that uniquely describes the property. The identifier and type are combined to form a "property tag," which is a constant that can be used to easily refer to the property. Property tags share a common format. They begin with the prefix "PR" and are made up of one or more words that describe the property. For example, PR_MESSAGE_BODY is the tag for the message body property. The property tag and value are stored together in system memory **15** (FIG. **1**) as a single data structure.

MAPI also employs "profiles," which are collections of information about the message services and service providers that a user of a client application **300** wants to be available during a particular MAPI session. Every user has at least one profile. Multiple profiles may be used in some cases. For example, a user might have one profile to work with a server-based message store service and another profile to work with a message store service on the local computer. A user may have profiles on more than one computer. Similarly, a computer may store profiles for more than one user. Profiles provide a flexible way to select combinations of message systems.

In the MAPI environment, a form is a viewer for an electronic message. Each message has a message class that determines the particular form that is used as its viewer. MAPI defines a few messages classes and has implemented the forms for viewing these messages. Client application developers can create new message classes and custom forms for viewing messages with the new classes.

Every custom form implements a set of standard menu commands (e.g., open, create, delete, and reply) and a set of commands that are specific to that particular form. These commands are also referred to as "verbs." FIG. **4** illustrates the MAPI form architecture, which involves three main components: a form registry provider **500**, a form server **505**, and a form viewer **510**.

The form registry provider **500** maintains a library of information about all of the forms available on the computer and enables the client to select a form that is suitable for the message being displayed. Form data is stored in a form registry **502**, which is stored in one of the computer's memory storage devices. The form server **505** is responsible for displaying the form and providing the information for the display. The form server manages the user's interaction with the form by interpreting the menu selections and processing the messages. The form viewer **510** is a component within a client application that contains the display and presents it to the user.

From the foregoing, it will be appreciated that MAPI provides a wide variety of features and functions in addition to those included in the brief description presented above. For additional information regarding MAPI, the reader may refer to the MAPI documentation, entitled Messaging Application Programming Interface (MAPI) version 1.0, which is published by Microsoft Corporation, and which is incorporated herein by reference.

AN EXEMPLARY APPLICATION PROGRAM

As mentioned above, an exemplary embodiment of the present invention is represented by the "OUTLOOK 97" desktop information manager. The preferred client application is divided into several modules, including a calendar manager, a task list manager, a contact manager, a message manager (e-mail), and a notes manager. In the preferred client application, integration between the modules is both simple and extensive because all information is stored in a MAPI data store, which is an extensible, object-oriented database. The preferred application program incorporates the features of MAPI version 1.0.

All folders (containers) contain objects, or items. In the preferred application program, there are a variety of kinds of items: e-mail items, appointment items, task items, address items, etc. Items have a set of fields and a behavior associated with them. For example, an e-mail item has To, From, CC, Subject, date and time fields among others. The behavior of e-mail items includes knowledge of what it means to Forward or Reply/Reply All.

In the preferred application program, items consist of a variety of data, which are stored as MAPI properties. A user views and interacts with an item in the context of a form, which includes a variety of fields. In some cases, a field maps directly to a MAPI property. However, there can be a many-to-many mapping between a form's fields and the MAPI properties in which the corresponding data are stored. Similarly, there may be properties that are not displayed in any of a form's fields.

In the preferred application program, each item is initially created from a template, which provides a "mold" for the new items. A template describes the fields and properties associated with the item, including the data types, default values, formatting rules, etc. For example, there would be a default template for each type of item listed above: appointments, to-do items, notes, e-mail messages, etc.

From this brief description, those skilled in the art will appreciate that the preferred application program provides a wide variety of features and functions in addition to those included in the brief description presented above. For additional information regarding the "OUTLOOK 97" application program, the reader may refer to the documentation that is distributed with the program.

THE PREFERRED METHOD FOR CREATING AND EDITING RULES FOR PROCESSING ELECTRONIC MESSAGES

Electronic message processing rules are user-defined instructions for managing incoming and outgoing electronic messages. Rules execute specific tasks when user-defined criteria are met and provide an effective way to process electronic messages without requiring users to spend a lot of time sorting through their inboxes deleting, filing, and responding to their messages. The present invention provides an improved system and method for creating and editing rules for processing electronic messages, such as e-mail, meeting requests, and task requests. Generally described, the invention is embodied in a "Rules Wizard," which divides the process into discrete steps and provides a user-friendly interface for creating and editing rules. At each step, the user selects the parameters that constitute the rule. As parameters are selected, the rule is composed and presented to the user in the form of a natural language (e.g., English) sentence, instead of in a programming-type language. If the rule requires more information from the user, the user is prompted by highlighted text within the natural language sentence itself. The user can then select the highlighted text and define the variable. The rule creating process is further simplified by the use of templates and context-specific rules. Once created, the rules may be executed by the client application or the mail server.

Each rule includes conditions and actions, and may also include exceptions. "Conditions" are the criteria that are available for making new rules. A rule will not be executed unless its conditions are satisfied. Each rule typically contains at least one condition. Multiple conditions can be strung together with "and" clauses. In this case, all of the conditions must be met for the rule to execute. Alternatively, multiple conditions could be joined using the disjunctive connector "or" so that action will be taken if one of several conditions is present. If a rule contains no conditions, it will be applied to every sent or received item (depending on whether it is a send rule or a delivery rule).

"Actions" are the events that occur when the rule's conditions are met. Each rule typically includes at least one action. Multiple actions can be assigned to a single rule. If multiple actions are to be executed, the order of execution may be critical to successful execution of the rule. For example, if a user wants to forward a message and then delete it, the steps must be carried out in that order. If the message is deleted first, it will not be available to be forwarded. In the "OUTLOOK 97" program, actions are organized by priority and are executed in order of priority in order to avoid such problems.

"Exceptions" allow a user to identify criteria or conditions that will prevent a rule from executing. Multiple exceptions may be combined with "or" clauses. If multiple exceptions are included, the actions associated with the rule will not be executed if any of the exceptions are true. Exceptions are optional.

Those skilled in the art will appreciate that although rules are presented or displayed to the user in a natural language format, each rule is also stored in a machine-readable format for execution by the computer. Generally described, the machine readable form of a rule includes a Boolean expression that represents the natural language rule's condition and exception clauses, and a list of actions that represent the natural language phrase's actions clauses.

The Boolean expression for each natural language condition or exception clause is of the form:

[PROPERTY] [COMPARISON OP] [VALUE]

where PROPERTY is the MAPI property or properties that correspond to the property mentioned in the rule, COMPARISON OP is the operator used for the comparison, and VALUE is the value the user specified for the variable. For example, PR_SUBJECT is the MAPI property used for a message's "subject" field, and the operator includes comparisons such as checking to see if two values are equal.

The machine-readable format for each natural language action clause is of the form:

[ACTION] [PARAMETER 1] [PARAMETER 2][. . .]

where ACTION is an identifier for the selected action and PARAMETER N is a parameter associated with the action. For example, the PARAMETER may be the identifier of the folder into which matching messages are to be filed.

The rules feature associated with the "OUTLOOK 97" program employs a "Rules Wizard" to provide step-by-step guidance during rule creation and editing. The Rules Wizard uses a sequence of windows to walk the user through the process of creating or editing a rule. A Start/Templates window provides a list of available templates, a switch for selecting send/delivery rules, and a rule description area. A Conditions window directs the user to select the conditions on which the rule will act. An Actions window allows the user to choose the action or actions the rule will execute. An Exceptions window gives the user a listing of available exceptions. Finally, a Naming window allows the user to name the rule and turn it on or off.

FIG. 5 is a state diagram of the method **550** carried out by the Rules Wizard. The method begins at the idle state **555**. When a user selects the create/edit rule function, the method **550** proceeds to state **560** and displays a Start/Templates window. This window allows the user to create a new rule or edit or rename an existing rule. The user may view a list of previously created rules, which are stored in the user's MAPI profile. If the user desires to create a new rule, the user may choose one of three options. First, the user may simply proceed to choose the conditions and actions from a list of available possibilities. Optionally, the user may select templates that are designed to carry out certain functions. The user may also select a "rules from context" option from the idle state **555**, which builds rules based on the properties of the message currently being viewed. Each of these options is discussed in more detail below.

When the user selects one of the available options at state **560** or selects the "rules from context" option from the idle state **555**, the method **550** proceeds to state **565** and displays a conditions window. The conditions window allows the user to choose the conditions on which the rule will act. In conditions that include variables, the variables are displayed as underlined text in order to indicate that the variables are defined via hypertext links. After a condition is selected, the user has the opportunity to select the hypertext link and define the variable from a dialog or other user interface object (state **570**). The user may also return to state **560** by selecting the "back" option. A list of exemplary conditions for display in the conditions window is provided in Table I.

TABLE I

-if sent directly to me
-if sent only to me
-if I am on the cc line
-if sent directly to me or I am on the cc line
-where I'm not on the 'To' line
-if from an address list
-if sent to an address list
-if subject contains specific words
-if body contains specific words
-if subject or body contain specific words
-if tagged for follow-up
-if the sender has marked it as important
-if the sender has marked it as sensitive
-if assigned to a category
-if it is an out-of-office notification
-if it has an attachment

FIGS. 6*a*, 6*b*, and 6*c* illustrate the type of information provided in the conditions window **600** as the user works through the process of selecting available conditions and providing required parameters (see states **565** and **570** of FIG. 5). The conditions window includes a conditions display area **605** and a rule description area **610**. The conditions display area **605** displays the conditions that are available to the user. The rule description area **610** includes a natural language statement of the rule as it is constructed. The conditions window **600** also includes controls labeled cancel **620**, back **625**, next **630**, and finish **635**. These controls perform the common functions of allowing a user to navigate between windows and to cancel or complete an operation.

FIG. 6*a* illustrates the state of the conditions window **600** when the Rules Wizard first displays the window (FIG. 5, state **565**). The conditions display area **605** includes a list of the conditions from which the user may choose. A check box is located next to each condition. At this point in the process, the rules description area **610** simply includes the initial phrase of a natural language expression of a rule ("For each message") and a statement indicating that the rule will be applied to messages as they are received. Alternatively, the user may specify that the rule is to be applied after an incoming message is first read, or when an outgoing message is sent. Similarly, rules may be designed to existing folders and their messages immediately, or on a periodic basis. This allows the rules feature to be used to "clean up" folders full of messages.

FIG. 6*b* illustrates the state of the conditions window **600** after the user has selected the condition "from an address list" in the conditions display area **605**. When a condition is selected, the rule description area **610** is modified to add the selected phrase to the natural language expression of the rule. Thus, the rule now reads "For each message from an address list" and expresses the conditional portion of the rule in an easy-to-understand natural language format.

The words "an address list" are underlined in order to represent a variable that must be replaced by the user. Those skilled in the art will appreciate that underlined text is commonly used to indicate a hypertext link. In order to define the variable (in this case, an address list), the user moves the cursor over the hypertext portion of the rule as it is displayed in the rules description area **610** and selects the hypertext. The Rules Wizard then displays a dialog (not shown) that allows the user to select from available objects, such as an address list (FIG. 5, state **570**).

Those skilled in the art will understand that when a user selects a variable, a dialog is displayed with the appropriate user interface for selecting variables of that type. For example, if the variable holds a mail address, the user gets a window that allows them to pick or enter a mail address. Likewise, if the variable holds a word, the user gets a window that allows them to enter a word.

FIG. 6*c* illustrates the conditions window **600** after the user has selected a specific address list in place of the variable in the condition statement. In this example, the user has defined the variable with an address list called "SOC Hiking Information." This name has been threaded back into the rule that is displayed in the rule description area **610**. Thus, the rule now reads "For each message from SOC Hiking Information." The address list name remains underlined in order to indicate that the address list is a variable. The address list name may be edited by selecting the underlined text in the rule description area **610** of the conditions window **600**.

When the user has finished selecting conditions and defining constituent variables, the user selects the Next control **630** and proceeds to select the actions that will form a part of the rules. This causes the method **550** (FIG. 5) to proceed from state **565** to state **575**.

At state **575** the Rules Wizard displays an actions window, which provides the user interface that allows the user to select the actions that will take place when the conditions are satisfied. Like the conditions described above, the actions that include variables are displayed as hypertext links. After an action is selected, the user has the opportunity to select the hypertext link and choose the variable from a dialog (state **580**). A list of exemplary actions for display in the actions window is provided in Table II.

TABLE II

-file it in the designated folder
-file a copy in the designated folder
-delete it
-forward it to an address list
-reply using a specific template
-notify me using a specific message
-tag it for follow up in 'n' days
-clear follow up
-assign to category
-play a .wav file
-mark it as important
-mark it as sensitive

FIGS. 7*a*, 7*b*, and 7*c* illustrate the type of information provided in the actions window **700** as the user works through the process of selecting available actions and providing required parameters (see states **575** and **580** of FIG. 5). The actions window includes an actions display area **705** and a rule description area **710**. The actions display area **705** displays the actions that are available to the user. The rule description area **710** includes the natural language statement of the rule as it is constructed. The actions window **700** also includes controls labeled cancel **720**, back **725**, next **730**, and finish **735**. These controls perform the common functions of allowing a user to navigate between windows and to cancel or complete an operation.

FIG. 7*a* illustrates the state of the actions window **700** when the Rules Wizard first displays the window (FIG. 5, state **575**). The actions display area **705** includes a list of the actions from which the user may choose. A check box is located next to each action. At this point in the process, the rules description area **710** includes the conditional portion of the rule that was defined earlier and the statement indicating that this rule will be applied to messages as they are received.

FIG. 7*b* illustrates the state of the actions window **700** after the user has selected the action "file it in the designated folder" in the actions display area **705**. When a action is selected, the rule description area **710** is modified to add the selected phrase to the natural language expression of the rule. Thus, the rule now reads "For each message from SOC Hiking Information, file it in the designated folder" and expresses the condition and action portions of the rule in an easy-to-understand natural language format.

The word "designated" is underlined in order to represent a variable that must be defined by the user. In order to define the variable (in this case, the destination folder), the user moves the cursor over the hypertext portion of the rule as it is displayed in the rules description area **710** and selects the hypertext. Alternatively, the user may tab to the highlighted hypertext part of the rule and press the "enter" key. In either case, the Rules Wizard then displays a dialog (not shown) that allows the user to select from available objects, such as an address list (FIG. **5**, state **580**).

FIG. **7***c* illustrates the actions window **700** after the user has identified a specific folder name in place of the variable in the action statement. In this example, the user has selected a folder called "Hiking." This folder name has been threaded back into the rule that is displayed in the rule description area **710**. Thus, the rule now reads "For each message from SOC Hiking Information file it in the Hiking folder." The folder name remains underlined in order to indicate that the folder name is a variable, which may be edited by selecting the underlined text in the rule description area **710** of the actions window **700**.

When the user has finished selecting conditions and defining variables, the user selects the Next control **630** and proceeds to select the actions that will form a part of the rules. This causes the method **550** (FIG. **5**) to proceed from state **575** to state **585**.

At state **585** the Rules Wizard displays an exceptions window, which provides the user interface that allows the user to select specific exceptions to the conditions that were specified earlier. Like the conditions and actions described above, the exceptions that include variables are displayed as hypertext links. After an exception is selected, the user has the opportunity to click on the hypertext link and select the variable from a dialog (state **590**). A list of exemplary exceptions for display in the exceptions window is provided in Table III.

TABLE III

-except if sent directly to me
-except is sent only to me
-except where I'm not on the 'To' line
-except if from an address list
-except if sent to an address list
-except if subject contains specific words
-except if body contains specific words
-except if subject or body contains specific words
-except if tagged for follow-up
-except if the sender has marked it as important
-except if the sender has marked it as sensitive
-except if assigned to category
-except if it is an out-of-office notification
-except if it has an attachment

FIGS. **8***a*, **8***b*, and **8***c* illustrate the type of information provided in the exceptions window **800** as the user works through the process of selecting available exceptions and defining constituent variables (see states **585** and **590** of FIG. **5**). The exceptions window includes an exceptions display area **805** and a rule description area **810**. The exceptions display area **805** displays the exceptions that are available to the user. The rule description area **810** includes a natural language statement of the rule as it has been constructed to this point. The exceptions window **800** also includes controls labeled cancel **820**, back **825**, next **830**, and finish **835**, which allow a user to navigate between windows and to cancel or complete an operation.

FIG. **8***a* illustrates the state of the exceptions window **800** when the Rules Wizard first displays the window (FIG. **5**, state **585**). The exceptions display area **805** includes a list of the exceptions from which the user may choose. A check box is located next to each exception. At this point in the process, the rules description area **810** includes the conditional and action portions of the rule that were defined earlier and the statement indicating that this rule will be applied to messages as they are received.

FIG. **8***b* illustrates the state of the exceptions window **800** after the user has selected the exception "except if body contains specific words" in the exceptions display area **805**. When an exception is selected, the rule description area **810** is modified to add the selected phrase to the natural language expression of the rule. Thus, the rule now reads "For each message from SOC Hiking Information, file it in the Hiking folder except if body contains specific words" and expresses the condition, action, and exception portions of the rule in an easy-to-understand natural language format.

The words "specific words" are underlined in order to represent a variable that must be replaced by the user. In order to define the variable (in this case, the specific words), the user moves the cursor over the hypertext portion of the rule as it is displayed in the rules description area **810** and selects the hypertext. The Rules Wizard then displays a dialog (not shown) that allows the user to specify the words that define the variable (FIG. **5**, state **590**).

FIG. **8***c* illustrates the exceptions window **800** after the user has provided specific words in place of the variable in the exception statement. In this example, the user has entered the words "Appalachian Trail." These words have been threaded back into the rule that is displayed in the rule description area **810**. Thus, the rule now reads "For each message from SOC Hiking Information file it in the Hiking folder except if body contains Appalachian Trail." The words "Appalachian Trail" remain underlined in order to indicate that they are a variable, which may be edited by selecting the underlined text in the rule description area **810** of the exceptions window **800**. As mentioned above, the window or dialog that allows a user to define a variable will vary depending on the type of variable being defined.

When the user has finished selecting exceptions and providing any required variables, the user selects the Next control **630** or Finish control **835**. This causes the method **550** (FIG. **5**) to proceed from state **585** to state **595**.

At state **595** the Rules Wizard displays an naming window, which allows the user to select name the rule and turn it on or off. Once the rule is named, the rule is stored in the user's MAPI profile. At that point, the Rules Wizard is removed from the display and the method **550** returns to the idle state **555**.

From the foregoing description, advantages of the present invention should be immediately apparent. For example, the Rules Wizard provides step-by-step guidance during rule creation and editing. The Rules Wizard uses a sequence of windows to walk the user through the process of creating a rule. The Start/Templates window provides a list of available template options and allows the user to view and edit previously created rules. The Conditions window directs the user to select the conditions on which the rule will act. The Actions window allows the user to choose the action the rule will execute. The Exceptions window gives the user a listing of available exceptions. Finally, the Naming window allows the user to name the rule and turn it on or off.

To modify an existing rule, the user selects the existing rule from a dialog. If the user simply wants to redefine a variable, he or she clicks the hypertext and selects from the dialog. If the user wants to change the structure of the rule, the user will be guided by the Rules Wizard.

Displaying the rules in a natural language format also allows users to create rules by stepping through a logical sequence (i.e., conditions, actions, exceptions) and piecing together clauses of natural language (e.g., English) text. Each clause may have one or more variables that need to be defined by the user. When completed, the rule reads like a natural language sentence. Natural language rules more accurately reflect the way users think about organizing mail and is more like the way people give instructions to other people. This approach completely avoids the need to think in a programming-like syntax or to type in rules from scratch.

The variables in the displayed rules are displayed as hypertext. When a user selects the variable, a dialog is displayed with the appropriate user interface for selecting the folder, user, etc. that is required to define the variable. Once selected, the user-selected variable is threaded back into the natural language sentence. Because the variable maintains it hypertext properties, it makes it easy for the user to determine exactly which parts of the rule are variable, and provides a consistent path for modifying the variables.

The "OUTLOOK 97" program also provides rules templates and "rules from context" features that further simply the process of creating rules.

Rule templates wrap common combinations of discrete conditions, actions, and exceptions into packages. When a user selects a particular template (FIG. 5, state 560) the associated conditions, actions, and exceptions are immediately displayed in the rule description area of the conditions window, with the variables displayed as hypertext links. After the rule has been displayed in the rule description area, the user proceeds to select the underlined variables and define values for those variables. This allows a user to quickly create a rule by selecting a template and defining the required parameters. A list of exemplary templates is provided in Table IV.

TABLE IV

-assign categories based on keyword
-notify me when important messages arrive
-file new messages based on keyword
-ignore a conversation
-flag messages from someone special
-assign categories to sent items
-file new messages from someone special
-file new messages sent to a distribution list
-flag message I send to someone special
-notify me when private messages arrive

For example, if the user selects the template entitled "file new messages from someone special" the Rules Wizard will then display a conditions window (FIG. 5, step 565) with the following rule displayed in the rule description area 610: "For each message from an address list file it in the designated folder." The user must then complete the rule by defining the address list and folder variables.

The "rules from context" features allows a user to create new rules based on the specific information in an existing message. If the user selects the rules from context feature from a mail window, the Rules Wizard no longer blindly offers its generic choices of conditions and actions. Instead, the Rules Wizard examines the properties of the selected message and offers "custom" suggestions for the variables in available conditions and actions statements. This is accomplished by splicing information from the active message and incorporating it into the natural language expression of the conditions and actions. Thus, the user creates a rule using the user interface provided by the Rules Wizard. However, the parameters from the selected, existing message are already threaded into the natural language statements.

If a user opens an e-mail message and then invokes the Rules Wizard, the Wizard will give the user the option of generating a rule that acts on parameters that are similar to the message that is currently open. FIG. 9*a* illustrates a conditions window **900** that will be displayed if a user selects the Rules Wizard while viewing a message that is from Tom Smith, has the subject "Hiking Equipment Sale," and is located in a folder entitled "Hiking." As illustrated in FIG. 9*a*, the Rules Wizard has extracted the salient features from the open messages and threaded parameters from that message into the available conditions, which are displayed in a conditions display area **905**.

Once the user chooses a condition or set of conditions, the Rules Wizard will offer several custom actions. FIG. 9*b* illustrates an actions window **910** with custom actions derived from the message in the example. Those skilled in the art will appreciate that the standard conditions and actions are still available and that other than expanding the choice of conditions and actions available, the Rules from Context feature does not alter the functionality of the Rules Wizard in any way.

To obtain the parameters that are displayed in the natural language rules that are created, the Rules from Context feature examines the relevant properties of the message on which it acts. The header fields or properties contain information such as the sender's name, the subject, the importance level, the sensitivity level, etc. The program then splices relevant information into natural language phrases. Those skilled in the art will appreciate that although the variables are automatically defined by the Rules from Context feature, they still maintain their hypertext properties and can be changed. Rules from Context streamlines the process of creating rules, which allows the user to be more efficient in his or her use of electronic messages. However, the feature does not limit the flexibility of the Rules system in any way because users still have the option to alter suggestions made by the Rules from Context.

The rules feature also provides independent client/server implementation of the rules. Those skilled in the art will appreciate that a client/server implementation is one in which many personal computers, referred to as clients, are connected to a central computer, called the server. While the clients maintain all of the functionality of personal computer, their connection to the server allows them to communicate with other clients through the server and to receive server-based services, such as mail services. Current mail systems allow a user to have a mailbox on the server as well as a mailbox on their client computer. The user can have mail delivered directly to either account. For example, the "OUTLOOK 97" program allows multiple transport providers to be registered in the user's MAPI profile. A user may have their company-related e-mail account on a server (e.g., a "Microsoft Exchange" server) and an Internet mail account on his or her personal computer. In this case, the e-mail will be delivered to the user's inbox on the client computer by different transport providers.

The rules feature in the "OUTLOOK 97" program is a true client/server implementation because rules can act upon messages delivered to either the server or the client. This allows mail to be processed at the server even if the user's computer is not operating. Because the rules execute in two locations, the system automatically maintains rule synchronization between the client and the server. If rules are modified while a client is offline, the rules are synchronized with the user's server the next time the client is connected to the server. This is accomplished by comparing the current set of client-based rules to the rules on the server. If there is a discrepancy, the user selects which set of rules he or she prefers to use, and the old rules on the client or server are updated accordingly.

Those skilled in the art will appreciate that not all rules can be run on the server because one or more of the conditions, actions, or exceptions is dependent on the client being logged in. When a rule is constructed, the program determines whether the rules includes client-dependent components. If so, the rule may not run on the server and resides solely on the client. If the rule does not include any client-dependent components, the rule will be uploaded to the server and registered with the user's mail server. Rules that are uploaded to the server will also be retained on the client. By implementing all rules on the client as client based rules, the system ensures that messages delivered to the user's inbox will be processed by the rules regardless of which transport provider delivered the message. In other words, a user may receive mail from multiple servers, and some of the servers may not be able to process rules. By having client rules, the rules are processed regardless of whether the message is received from a server that can or cannot process rules. However, by running the rule on the server when possible, the system ensures that messages will be processed quickly and efficiently even if the client is not logged in. If a rule is run on a message at the server, that rule will not be run again when the message reaches the client computer.

SUMMARY OF THE DETAILED DESCRIPTION

From the foregoing description, it will be appreciated that the present invention provides an improved system and method for creating, editing, and distributing rules for processing electronic messages. In an exemplary system, a Rules Wizard provides simple, step-by-step guidance through the rule making process. At each step, rules are constructed from natural language phrases that are selected by the user. As a condition, action, or exception is selected, the rules is displayed in a natural language format. Any variables in the natural language representation of the rule are highlighted and displayed as hypertext links. When the variable is specified by the user, the generic variable is replaced with the specific information provided by the user. Rule creation is further facilitated by choosing a predefined template, or by creating a new rule based on the properties of a currently open message. Finally, the rules are distributed between the client and server and synchronized in order to process messages in the most efficient and timely manner.

The foregoing system may conveniently be implemented in one or more program modules that are based upon the state diagram of FIG. 5, and the features illustrated in FIGS. 6–9. No particular programming language has been described for carrying out the various procedures described above because it is considered that the operations, steps, and procedures described above and illustrated in the accompanying drawings are sufficiently disclosed to permit one of ordinary skill in the art to practice the present invention. Moreover, there are many computers and operating systems which may be used in practicing the present invention and therefore no detailed computer program could be provided which would be applicable to all of these many different systems. Each user of a particular computer will be aware of

the language and tools which are most useful for that user's needs and purposes.

Although the invention was described in the context of a program in which the conditions, actions, exceptions, and templates are predefined, those skilled in the art will appreciate that the present invention is extensible and that system administrators may be able to implement rules components and templates in addition to those described herein.

The present invention has been described in relation to particular embodiments which are intended in all respects to be illustrative rather than restrictive. Alternative embodiments will become apparent to those skilled in the art to which the present invention pertains without departing from its spirit and scope. Accordingly, the scope of the present invention is defined by the appended claims rather than the foregoing description.

What is claimed is:

1. In a computer system having a graphical user interface including a display device and a user interface selection device, a method for constructing a rule for processing electronic messages, comprising the steps of:

displaying on the display device the current state of the rule in a natural language format;

displaying on the display device a plurality of conditions upon which the rule will cause action to be taken;

receiving from the user interface selection device an input signal indicating the selection of one of the conditions;

in response to the selection of one of the conditions, adding the selected condition to the displayed current state of the rule;

displaying on the display device a plurality of actions that may be taken in response to the condition;

receiving from the user interface selection device an input signal indicating the selection of one of the actions;

in response to the selection of one of the actions, adding the selected action to the displayed current state of the rule;

displaying on the display device a list of exceptions to the selected condition;

receiving from the user interface selection device an input signal indicating the selection of one of the exceptions; and

in response to the selection of one of the exceptions, adding the selected exception to the displayed current state of the rule.

2. The method of claim 1, wherein the displayed current state of the rule includes a variable displayed as a highlighted object, and further comprising the steps of:

receiving from the user interface selection device an input signal indicating the selection of the highlighted object;

in response to the selection of the highlighted object, displaying on the display device a user interface object including a definition for the variable;

receiving from the user interface selection device an input signal indicating the definition of the variable; and

in response to the definition of the variable, displaying on the display device the current state of the rule with the definition in place of the variable.

3. The method of claim 1, further comprising the step of examining properties associated with an existing message; and

wherein the plurality of conditions and plurality of actions include a plurality of displayed variables derived from the properties associated with the existing message.

4. The method of claim 1, further comprising the steps of:

determining whether the rule may be run on a server; and

in response to the rule being able to be run on the server, uploading the rule to the server.

5. The method of claim 1, further comprising the step of storing the rule for subsequent processing of electronic messages.

6. The method of claim 5, wherein the rule is stored on the computer system and on a server associated with the computer system.

7. The method of claim 6, wherein the rule is executed on only one of the computer system and the server.

8. The method of claim 6, further comprising the step of synchronizing rules stored on the computer system with rules stored on the server.

9. The method of claim 1, wherein the rule is used to process electronic messages stored in a folder.

10. In a computer system having a graphical user interface including a display device and a user interface selection device, a method for constructing a rule for processing electronic messages, comprising the steps of:

displaying on the display device a list of rule templates;

receiving from the user interface selection device an input signal indicating the selection of one of the rule templates;

displaying on the display device a condition associated with the selected template;

displaying on the display device an action associated with the selected template;

displaying on the display device the current state of the rule in a natural language format;

displaying on the display device a list of exceptions to the selected condition;

receiving from the user interface selection device an input signal indicating he selection of one of the exceptions;

in response to the selection of one of the exceptions, adding the selected exception to the displayed current state of the rule; and

storing the rule for subsequent processing of electronic messages.

11. The method of claim 10, wherein the displayed current state of the rule includes a variable displayed as highlighted object, and further comprising the steps of:

receiving from the user interface selection device an input signal indicating the selection of the highlighted object;

in response to the selection of the highlighted object, displaying on the display device a dialog including a definition for the variable;

receiving from the user interface selection device an input signal indicating the definition of the variable; and

in response to the definition of the variable, displaying on the display device the current state of the rule with the definition in place of the variable.

12. The method of claim 11, wherein the highlighted object comprises highlighted text.

13. A computer-readable medium having computer-executable instructions for performing the steps recited in claim 10.

14. A computer-readable medium having computer-executable instructions for performing steps comprising:

displaying a plurality of conditions upon which the rule will cause an action to be taken;

receiving an input signal indicating the selection of one of the conditions;

displaying a plurality of actions that may be taken in response to the condition;

receiving an input signal indicating the selection of one of the actions;

displaying the current state of the rule in a natural language format, the rule including the selected condition, the selected action, and a variable displayed as a highlighted object;

receiving an input signal indicating the selection of the highlighted object;

in response to the selection of the highlighted object, displaying a dialog including a definition for the variable;

receiving an input signal indicating the selection of the definition for the variable;

in response to the selection of the definition of the variable, displaying the current state of the rule with the definition in place of the variable;

displaying a list of exceptions to the selected condition;

receiving an input signal indicating the selection of one of the exceptions;

in response to the selection of one of the exceptions, adding the selected exception to the displayed current state of the rule; and

storing the rule for subsequent processing of electronic messages.

15. The computer readable medium of claim 14, wherein the instructions further perform the step of examining properties associated with an existing message; and

wherein the variable is derived from the properties associated with the existing message.

16. The computer readable medium of claim 14, wherein the instructions further perform the steps of:

determining whether the rule may be run on a server; and

in response to the rule being able to be run on the server, uploading the rule to the server.

17. The computer readable medium of claim 14, wherein the highlighted object comprises highlighted text.

18. A method for distributing electronic message handling rules between a server and a client having a display device and a user interface selection device, comprising the steps of:

displaying on the display device the current state of the rule in a natural language format;

displaying on the display device a plurality of conditions upon which the rule will cause action to be taken;

receiving from the user interface selection device an input signal indicating the selection of one of the conditions;

in response to the selection of one of the conditions, adding the selected condition to the displayed current state of the rule;

displaying on the display device a plurality of actions that may be taken in response to the condition;

receiving from the user interface selection device an input signal indicating the selection of one of the actions;

in response to the selection of one of the actions, adding the selected action to the displayed current state of the rule;

displaying on the display device a list of exceptions to the selected condition;

receiving from the user interface selection device an input signal indicating he selection of one of the exceptions;

in response to the selection of one of the exceptions, adding the selected exception to the displayed current state of the rule;

determining whether the selected condition may be run on a server;

determining whether the selected action may be run on the server;

determining whether the selected exception may be run on the server; and

in response to the selected condition, the selected action and the selected exception being able to be run on the server, uploading the rule to the server.

19. The method of claim **18**, wherein the displayed current state of the rule includes a variable displayed as highlighted text, and further comprising the steps of:

receiving from the user interface selection device an input signal indicating the selection of the highlighted text;

in response to the selection of the highlighted text, displaying on the display device a dialog including a definition for the variable;

receiving from the user interface selection device an input signal indicating the selection of the definition for the variable; and

in response to the selection of the definition of the variable, displaying the current state of the rule with the definition in place of the variable.

20. The method of claim **18**, further comprising the steps of examining properties associated with an existing message; and

wherein the plurality of conditions and plurality of actions include a plurality of displayed variables, and wherein the plurality of displayed variables are derived from the properties associated with the existing message.

21. The method of claim **18**, wherein the electronic mail handling rules are executed on only one of the server and the client.

22. A computer system for creating rules for processing electronic messages, comprising:

a processing unit;

an input device connected to the processing unit; and

a display device connected to the processing unit for displaying the message item;

memory connected to the processing unit and containing a program module;

the processing unit, responsive to instructions from the program module, being operative to:

display on the display device a plurality of conditions upon which the rule will cause action to be taken;

receive from the input device an input signal indicating the selection of one of the conditions;

display on the display device a plurality of actions that may be taken in response to the condition;

receive from the input device an input signal indicating the selection of one of the actions;

display on the display device the current state of the rule in a natural language format, the rule including the selected condition, the selected action, and a variable displayed as highlighted text;

receive from the input device an input signal indicating the selection of the highlighted text;

in response to the selection of the highlighted text, display on the display device a dialog including a definition for the variable;

receive from the input device an input signal indicating the selection of the definition for the variable;

in response to the selection of the definition of the variable, display on the display device the current state of the rule with the definition in place of the variable;

display on the display device a list of exceptions to the selected condition;

receive from the user interface selection device an input signal indicating he selection of one of the exceptions;

in response to the selection of one of the exceptions, add the selected exception to the displayed current state of the rule; and

store the rule for subsequent processing of electronic messages.

23. The computer system of claim **22**, wherein the processing unit is further operative to examine properties associated with an existing message; and

wherein the variable is derived from the properties associated with the existing message.

24. The computer system of claim **22**, wherein the processing unit is further operative to:

determine whether the rule may be run on a server; and

in response to the rule being able to be run on the server, upload the rule to the server.

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